

Appl. No. : 10/036,198
Filed : December 28, 2001

REMARKS

The Office Action mailed September 10, 2004 is based upon pending Claims 1-59, 99, and 109-111. This Amendment, mailed in response to the September 10, 2004 Office Action, amends Claims 1, 13, 25, 31-35, 41, 47, 48, 54, 99, and 109. Applicant reserves the right to pursue the claims pending prior to this amendment in one or more continuation applications. After entry of this Amendment, Claims 1-59, 99, and 109-111 remain pending and are presented for further consideration.

Rejections under 35 U.S.C. 102(b)

Claims 1, 2, 4, 5, 8, 10-12, 18, 24, 32-34, 41-48, and 99 are rejected under 35 U.S.C. §102(b) as being fully anticipated by Shirasaki et al (U.S. Patent No. 4,806,442).

The Office Action states that Shirasaki et al describes contacting a phase shifted phase grating mask with a photoresist layer and exposure through the mask with a laser to record the pattern in the resist. The Office Action further states that the claimed process steps are anticipated and that the result would be inherent in the process.

Although Applicants disagree that the claimed invention is inherent in the process taught by Shirasaki et al, Applicants submit that Shirasaki et al fails to teach that the curable material comprises an optical liquid as recited in Claims 1, 2, 4, 5, 8, 10-12, 18, 24, 32-34, 41-48, and 99, as amended. Shirasaki et al also does not disclose a volume holographic optical element or volume hologram which is recited in amended Claims 1, 2, 4, 5, 8, 10-12, 18, 24, 32-34, 41-48, and 99.

As Shirasaki et al fails to disclose each of the limitations recited in Claims 1, 2, 4, 5, 8, 10-12, 18, 24, 32-34, 41-48, and 99, it is submitted that Shirasaki et al does not anticipate. Applicants therefore respectfully request that the rejection of Claims 1, 2, 4, 5, 8, 10-12, 18, 24, 32-34, 41-48, and 99 under 35 U.S.C. §102(b) be withdrawn.

Rejections under 35 U.S.C. 103(a)

Claims 1-5, 8, 10-12, 18, 24, 32-34, 41-50, 53, and 99 are rejected under 35 U.S.C. §103(a) as being unpatentable over Pettigrew et al (U.S. Patent No. 4,657,780). Claims 41-46 are also rejected under 35 U.S.C. §103(a) as being unpatentable over Ikeda et al (U.S. Patent No. 4,904,033), in view of Moss et al (U.S. Patent No. 5,315,417). Further, Claims 1-5, 8, 10-12, 18-

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24, 31-34, 41-53, and 99 are rejected under 35 U.S.C. §103(a) as being unpatentable over Pettigrew et al, in view of Haugh (U.S. Patent No. 3,658,526). Additionally, Claims 1-5, 8-59, 99, and 109-111 are rejected under 35 U.S.C. §103(a) as being unpatentable over Pettigrew et al, and Haugh, in view of Ingwall et al (U.S. Patent No. 5,198,912) and Sutherland et al (WO 01/90822).

Applicants believe that Claims 1-5, 8-59, 99, and 109-111 are not obvious from the combination of cited references. Applicants point out, for example, that Claims 1-5, 8-59, 99, and 109-111 recite that the curable material comprises an optical liquid, which is not fairly taught by the combination of cited references.

Applicants note that the Office Action states that Ingwall et al teaches filling the voids in a hologram with liquid crystal materials. The Office Action further states that Sutherland et al teach contact exposure of polymer dispersed liquid crystal materials (PDLC). The Office Action argues that it would have been obvious to one skilled in the art to modify the process of Pettigrew et al and Haugh by using contact exposure of the master with a PDLC composition such as disclosed by Sutherland et al to facilitate forming an electronically variable diffraction efficiency in the holographic medium.

Applicants maintain, however, that one skilled in the art would not be motivated to combine Pettigrew et al (and Haugh) together with Ingwall et al and Sutherland et al. Ingwall et al, entitled "Volume Phase Hologram with Liquid Crystal in Microvoids between Fringes" teaches volume phase holograms (see, e.g., column 2, lines 15-55). Similarly, Sutherland et al entitled "A System and Method for Replicating Volume Holograms" describes switchable volume holograms. Although the Office Action states that Sutherland et al teaches that the master may be various hologram types including surface holograms, the paragraph (starting on line 13 of page 22) that refers to "surface hologram" begins with the statement that "the master hologram is not limited to a PDLC hologram." Nowhere does Sutherland teach surface holograms comprising PDLC.

In contrast, Pettigrew et al shows a diffraction grating formed by bringing a grating-bearing surface coated with a release agent together with a rigid substrate having a layer of UV sensitive liquid resin applied thereto to form a profiled, cured, resin film (see FIGS. 1A-1E). Nowhere does Pettigrew et al teach volume holography.

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One skilled in the art would not be motivated to combine the teachings regarding liquid crystal in Ingwall et al and Sutherland et al in the context of switchable volume holograms with the teachings regarding forming a profiled resin film to manufacture the diffraction gratings of Pettigrew et al. Moreover, it would not be obvious to one skilled in the art having knowledge of the combined teachings of Pettigrew et al (and Haugh), Ingwall et al, and Sutherland et al to use optical liquids such as liquid crystal for switchable volume holograms in forming the diffraction gratings taught by Pettigrew et al. Applicants have attached a copy of a Declaration executed by Prof. John Caulfield that supports these conclusions.

Applicants submit therefore that Claims 1-5, 8-59, 99, and 109-111 are patentable over the cited references. Applicants respectfully request that the rejection of Claims 1-5, 8-59, 99, and 109-111 under 35 U.S.C. §103(a) be withdrawn.

CONCLUSION

Applicants have endeavored to address all of the Examiner's concerns as expressed in the outstanding Office Action. In light of the above remarks, reconsideration and withdrawal of the outstanding rejections is specifically requested.

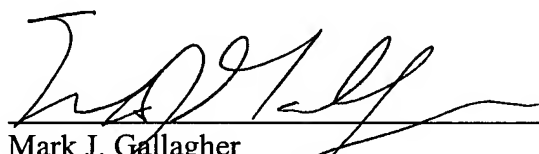
Respectfully submitted,

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Dated: _____

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